WHAT IS CLAIMED IS:

1. A switching element comprising:

a waveguide substrate;

first and second light-transmitting waveguides formed of a core and cladding layers extending along said waveguide substrate to a trench and being positioned such that optical coupling between said first and second waveguides is dependent upon optical characteristics exhibited at said trench;

a displaceable device having a first position and a second position relative to said trench, said first and second waveguides being optically coupled when said displaceable device is in said second position and being substantially optically isolated when said displaceable device is in said first position; and

means for manipulating said displaceable device between said first position and said second position.

2. The switching element of claim 1 further comprising a third light-transmitting waveguide formed of said core layer on said waveguide substrate, said third waveguide intersecting said trench on a side of said trench opposite to said first waveguide such that said first and third wave-guides are optically coupled when said displaceable device is in said first position.

3. The switching element of claim 1 wherein said displaceable device is a micromachined mirror.

4. The switching element of claim 3 wherein means for manipulating is a micro-electromechanical system (MEMS).

5. The switching element of claim 3 wherein said micromachined mirror is controlled by said means for manipulating to have sufficient movement such that said first position is within said trench and said second position is outside of said trench.

6. The switching element of claim 3 wherein said micromachined mirror is controlled by said means for manipulating to slide within said trench between said first and second positions, such that said micromachined mirror remains in said trench.

7. The switching element of claim 1 further comprising first and second optical fibers aligned with said substrate to be optically coupled to said first and second waveguides, respectively.

8. The switching element of claim 1 further comprising an actuator substrate connected to said waveguide substrate, said means for manipulating being a micromachined mechanism formed on said actuator substrate.

9. The switching element of claim 1 further comprising fluid within said trench, said fluid having an index of refraction similar to an index of refraction of said first and second waveguides.

10. The switching element of claim 1 further comprising an antireflection coating at interfaces of said trench with said first and second waveguides.

11. An optical routing matrix comprising:

a waveguide substrate having at least one trench along a surface of said waveguide substrate;

an array of optical crosspoints at said at least one trench, said optical crosspoints being defined by a plurality of waveguides extending along said surface of said waveguide substrate to form a planar lightwave circuit, each optical crosspoint being substantially at an optical intersection of an input waveguide with first and second waveguides that are on opposite sides of a corresponding trench; and

a plurality of solid actuators positioned to correspond to said optical crosspoints, each actuator having a reflecting position in which a corresponding one of said input waveguides is optically coupled to a corresponding said second waveguide, each actuator further having a non-reflecting position in which said corresponding one of said input waveguides is optically coupled to a corresponding said first waveguide.

12. The matrix of claim 11 wherein said actuators are micromachined members having micromirrors.

13. The matrix of claim 12 wherein each said micromirror is manipulated by one of said micromachined members to shift between said reflecting position within one of said trenches and said non-reflecting position outside of said trenches.

14. The matrix of claim 12 wherein each said micromirror is manipulated by one of said micromachined members to slide within one of said trenches.

15. The matrix of claim 11 further comprising a liquid within each said trench, said liquid having a refractive index similar to a reflective index of the material that forms said waveguides.

16. A method of routing optical signals comprising steps of:

forming a plurality of light-transmitting waveguides on a waveguide substrate, including forming a trench at a crosspoint of said waveguides such that optical coupling of an input waveguide to spaced apart first and second waveguides is dependent upon optical characteristics at said crosspoints;

providing a micromirror that is displaceable between a first position and a second position; and

switching said optical coupling of said input waveguide by manipulating said micromirror, including displacing said micromirror to said first position at said crosspoint to optically couple said input waveguide to said second waveguide, and further including removing said micromirror from said crosspoint to optically couple said input waveguide to said first waveguide.

17. The method of claim 16 wherein said step of switching includes using mirror-displacement techniques equivalent to techniques used to manipulate print members in a dot matrix printer engine.

18. The method of claim 16 wherein said step of switching includes using a MEMS actuator.

19. The method of claim 18 wherein said step of switching includes sliding said micromirror within said trench.

20. The method of claim 16 further comprising filling said trench with a liquid.